Water budgets of the two Olentangy River experimental wetlands in 1998

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Introduction

An understanding of the different types of water inflows and outflows affecting a wetland and their balance over time, is basic to the understanding of wetland functioning. For example, the transport and disposition of dissolved and suspended materials (important for water quality improvement) and the storage and release of water (important for stream flow regulation) can only be determined in the context of a wetland's overall water budget. A combination of manual and automated observation systems provides a wealth of information on the daily, and even hourly, water fluxes for the two experimental wetlands at the Olentangy River Wetland Research Park (ORWRP). Also, as resources became available, additional instrumentation has been added to the wetlands to allow more refinement in the water budgets. For example, continuous water level recorders were added to the experimental wetland basins in 1996 to allow more frequent measurement of water level changes and better estimates of infrequent flood events.

The task of integrating these observations into a water budget is nonetheless a difficult one, in part because of the very abundance of data and also because of the periodic occurrence of atypical events such as floods and equipment malfunction. Procedures were developed to routinize the processing of these data, allowing water budgets to be compiled on a consistent basis (Wang et al., 1997). These procedures were used as a model in developing the 1998 wetland water budgets.

Methods

The following general equation was used to determine a water budget for each ORWRP experimental wetland:

$$S_i + F_i + P - S_o - ET - G_o - \Delta V = 0 \quad (1)$$

where,

S_i = pumped inflow (surface)
F_i = flood inflow (due to floods on the Olentangy River)
P = precipitation
S_o = surface outflow
ET = evapotranspiration
G_o = ground water outflow (seepage)
ΔV = change in volume

All parameters were developed in equivalent units for a budget calculation; either average flow rate (i.e., gpm) over a given time period, or total depth (i.e., cm) over a given time period, where total area was taken as a nominal 10,000 m^3 (1 ha) for each wetland.

A 4-hour time increment was used as the basis for computing all parameters in 1998. However, the budget is reported only for daily values.

Pumped Inflow (S_i)

Twice-daily (morning and evening) readings of both instantaneous and total integrated volume of pumping rates have been generally collected by staff and students from the flow monitors in each pipe going to each wetland. Many gaps have continued to exist in the data when flow gages clogged or when readings were missed. When data from only one wetland inflow were available, the missing flow rate was assumed to be the same as the available flow rate (the protocol for the experimental wetlands has been, since the start, to deliver the same flow to each wetland at all times). When both flow gages were malfunctioning, flow was estimated for both from the best estimate of previous readings or from pump settings (number of turns open). When pumps were shut down, either by site managers or through accident, the time of shutdown was estimated from field records and flow was prorated for only the period when pumps were operating.

For the 1998 budget, readings from the inflow meters were interpolated to determine 4-hour total flow increments, in gallons, for each wetland. Water level recorder data charts, when available, were used to determine exact times of power outages or other unusual occurrences.

Flood Inflow (F_i)

There was no surface flood on the site in 1998.

Precipitation (P)

Precipitation was measured on half-hour frequency with a Unidata Model 6506B tipping bucket rain gage located in the on-site meteorological station located between the two experimental wetlands. When the gage was not working during winter, precipitation data were obtained from two-per-day site monitoring of 3 precipitation gages that were emptied after each recording or from liquid precipitation data from the OSU Agronomy Farm weather station, located 1 km from the ORWRP. The half-hourly precipitation data from the on-site weather station were used to derive 4-hour precipitation totals. Liquid precipitation in the form of snow

was not easily accounted for during winter.

Surface Outflow (S_o)

Outflow measurements from the experimental wetlands are based on wetland water level and the status of the control weir boxes constructed at the southern edge of the basins. The three important variables needed are: 1) the water level in the basins: 2) the status of weirs or other control devices in the weir boxes; and 3) the crest elevation of the weir or other control device. These data are then used with weir equations that relate head to rate of outflow. When outflow was blocked with debris, outflow was estimated from equation 1.

Wetland Water Level

From the beginning of the project, water level has been recorded twice-per-day by reading a staff gauge located near the outflow. Beginning in early 1996, water level was continuously recorded by Stevens Type F water level recorders located in the southernmost deep pool of each wetland and accessible by boardwalk. Recordings were set to 1:1 scale and charts are changed weekly. Water levels were graphically determined from chart records at 4-hour intervals.

Weir Box Status

The status of the wetland weir box since the beginning of the wetland operation is shown in Table 1. Four different conditions of weir box outflow control occurred: v-notch plate in place (V+0); v-notch and one stoplog in place (V+1); v-notch and two stoplogs in place (V+2); no v-notch or stoplog (noweir).

Weir Crest Elevation

Head was determined by wetland water level elevation minus v-notch elevation (crest). Ice and vandals have been known to move the staff gage relative to the weir boxes. However, V-notch elevations relative to staff gauge measurements were not measured. These 1997 calibrated crest values are shown in Table 2. The equations developed for the water budget year 1996 were used (Wang et al., 1997).

For head values < 0.75 feet, a simple weir equation was used:

$$S_o = 2.0 * H^{2.5} \quad (2)$$

where,

S_o = outflow, cfs,
H = head, feet.

For head values > 0.75 feet, the compound weir equation was used:

$$S_o = 1.7 * H^{1.2} \quad (3)$$

Flow Equations with No Weir

When no weir plate was in place, weir equations could not be used and rating curves developed from velocity readings in the outflow pipes downstream of the weirs were used to estimate outflow. These empirical equations are:

Table 1. Chronology of outflow weir changes and other major hydrology events affecting ORWRP hydrology during 1998.

Date	Pump change	Weir Code change*
1/1/98 8:00	off	v+0
1/3/98 12:08	on	v+0
1/19/98 12:00	off	v+0
1/19/98 17:00	on	v+0
2/4/98 9:10	off	v+0
2/4/98 16:00	on	v+0
3/11/98 9:15	off	v+0
3/11/98 16:00	on	v+0
5/12/98 9:20	off	v+0
5/12/98 9:40	on	v+0
5/13/98 15:40	off	v+0
5/14/98 8:30	on	v+0
5/16/98 10:00	off	v+0
5/16/98 11:10	on	v+0
6/29/98 10:50		no weir
8/24/98 19:16	off	no weir
8/28/98 11:45	on	no weir
9/15/98 9:12	off	no weir
9/18/98 17:50	on	no weir
9/18/98 18:10	off	no weir
9/18/98 19:00	on	no weir
10/5/98 18:35	off	no weir
10/9/98 16:50	on	no weir
10/22/98 10:20	off	no weir
10/22/98 10:35	on	no weir
10/29/98 10:30	off	no weir
10/29/98 10:40	on	no weir
11/4/98 17:30	off	no weir
11/5/98 11:00	on	no weir
11/6/98 8:45	off	no weir
11/8/98 16:30	on	no weir
12/28/98 9:05	off	no weir
12/29/98 13:17	on	no weir

* weir code:
V+2 = v-notched weir plus two slats;
V+1=v-notched weir plus one slat;
V+0=v-notched weir plate only;
noweir=outflow with no weir plate; and
noweirconstr=outflow with no weir plate.

Table 2. Staff gage readings of crests for various weir settings, 1997.

	designation	W1	W2
weir plus 2 slats	V+2	1.63	1.84
weir plus 1 slat	V+1	1.21	1.42
weir only	V+0	0.79	1.00
no weir	noweir	0.29	0.50

$$\text{for Wetland 1: } S_o = 0.671\ H^{1.762} \quad (4)$$

$$\text{for Wetland 2: } S_o = 0.8631\ H^{1.7592} \quad (5)$$

with the same units as in Equation 2. The head here is the elevation above the bottom of the empty weir box.

Evapotranspiration (ET)

For 1998, pan evaporation data from the on-site weather station were used and corrected using a factor of 0.75.

Seepage to Ground Water (G_o)

Over the past, wetland hydrologic records were analyzed to identify periods when S_i, F_i, and S_o were all zero. Since S_i and S_o are of much greater magnitude than other elements of the water budget equation, when the former are known to be zero it is reasonable to assume that the residual, R, is also essentially zero. Therefore, changes in wetland volume during these periods that were not accounted for by precipitation or evapotranspiration could be used to estimate seepage, as follows:

$$G_o = -\Delta V + P - ET \quad (6)$$

Table 3. Annual water budgets for the two experimental wetlands at the Olentangy River Wetland Research Park, 1998.

	W 1	W 2	W 1	W2
Budget Component	gpm		m	
INFLOWS				
Pumping	184.3	183.4	36.7	36.5
Precipitation	3.5	3.5	0.7	0.7
OUTFLOWS				
Surface Out	175.4	149.8	34.9	29.8
Evapotrans.	5.4	5.4	1.07	1.07
Seepage	7.5	32	1.49	6.39
Δ VOLUME	-0.4	-0.3	-0.08	-0.06

Time periods during which the no-inflow/no-outflow criteria were satisfied (see Appendix A) occurred when pumps were shut down, either for drawdown or for maintenance reasons, and wetland water levels were below the weir. However, no such periods were observed during 1998. We treated residule in the water budget as seepage to ground water.

Change in Volume (ΔV)

Net change in wetland volume over any given period was determined using beginning and ending water level and a known relationship between water level and wetland volume. Net change was calculated from charts on an every-four-hour basis and was used to calculate the water budget on a four-hour basis.

Results and Discussion

Figure 1 shows water levels of both Wetland 1 and

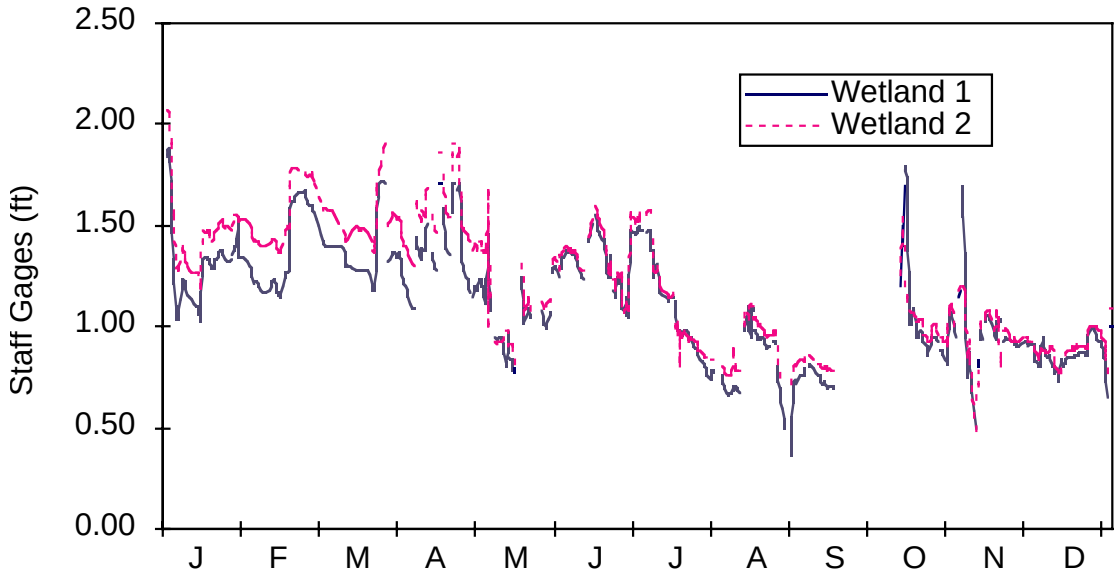

Figure 1. Water levels of Wetland 1 and Wetland 2 in 1998.

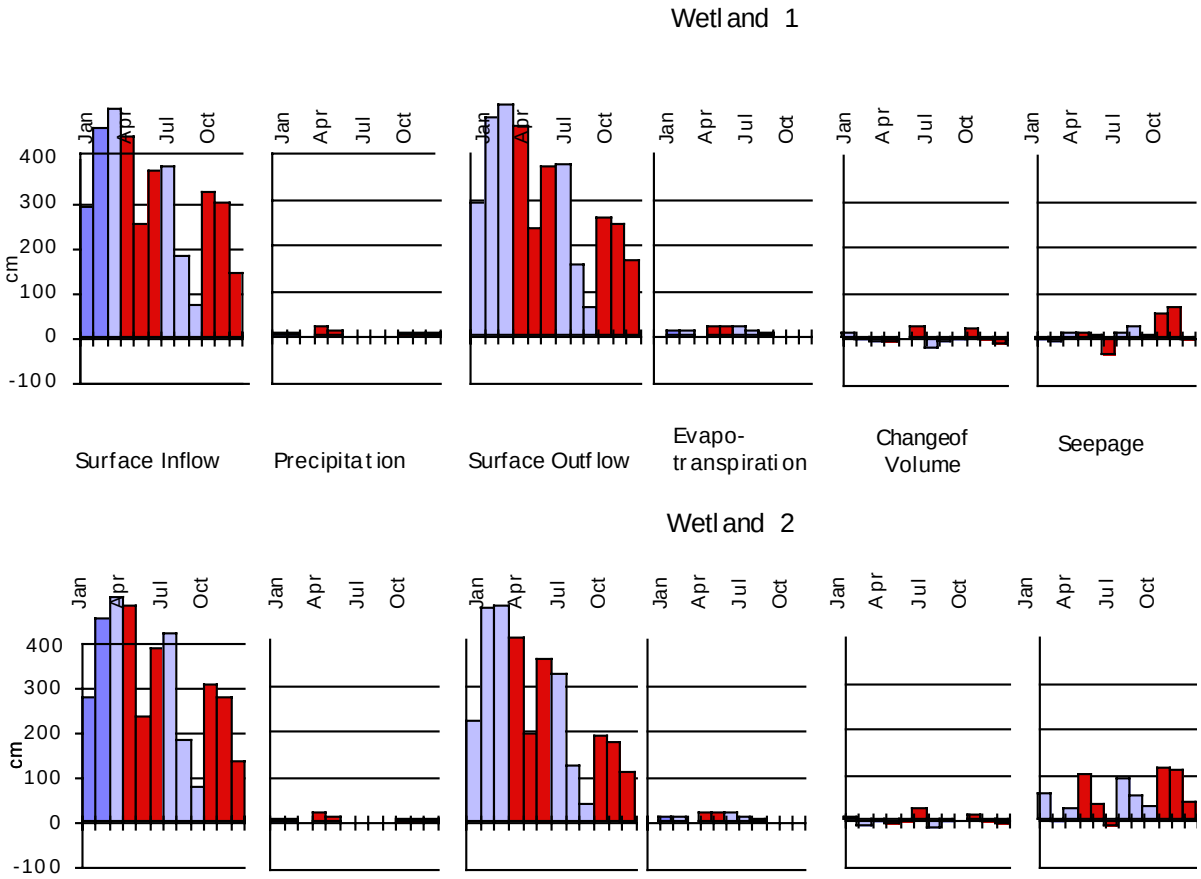

Figure 2. 1998 monthly water budgets for Wetlands 1 and 2. Surface inflows for April and May include flood inflows.

Wetland 2 in 1998. Annual hydrologic budgets were summarized for 1998 (Table 3). Monthly hydrologic budgets of 1998 are displayed in Figure 2. Daily flows on which these budgets are based are presented in Appendices A and B. In 1998, inflows to Wetlands 1 and 2 were 36.7 m and 36.5 m, respectively. Surface outflow for 1998 was estimated to be 34.9 m and 29.8 m respectively for Wetlands 1 and 2. They were approximately 96% and 82% of pumped inflow; the large amount of water lost in Wetland 2 most likely seeped into the adjacent mitigation wetland. The average retention time in 1998 was 1.8 - 2.0 days (Figure 3), about the same as in 1997 but much shorter than in 1996.

References

Wang, N., R.J.F. Bruins, W.J. Mitsch, and W.T. Acton. 1997. Water budgets of the two Olentangy River experimental wetlands 1994-96. In: W.J. Mitsch, ed., Olentangy River Wetland Research Park at The Ohio State University, Annual Report 1996, pp. 55-84.

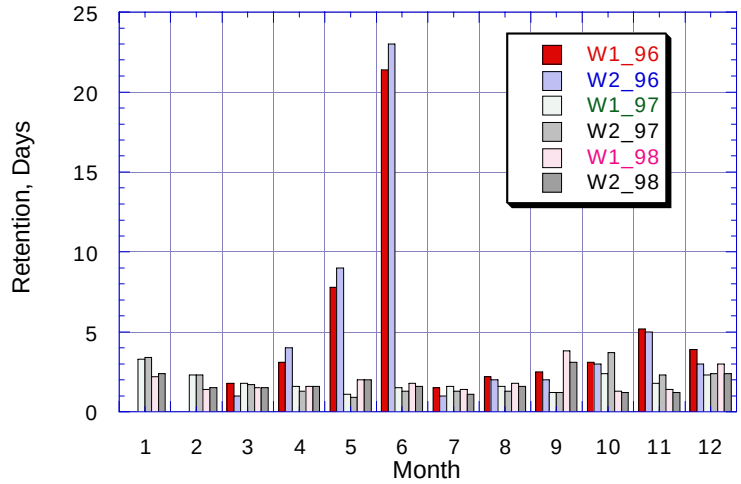

Figure 3. Retention time of Wetlands 1 and 2 in 1996, 1997 and 1998.

Appendix A. Daily hydrologic budget for Wetland 1, 1998

Date	Wetland 1, gpm						Wetland 1, cm					
	Inf	Outf	Precip	Evap	DVol	Seepage	Inf	Outf	Precip	Evap	DVol	Seepage
1/1/98	0	61	0	2	0	-63	0.0	3.3	0.0	0.1	0.0	-3.4
1/2/98	138	61	0	1	0	76	7.5	3.3	0.0	0.0	0.0	4.1
1/3/98	201	61	1	0	0	141	11.0	3.3	0.0	0.0	0.0	7.7
1/4/98	164	61	2	1	0	103	8.9	3.3	0.1	0.0	0.0	5.6
1/5/98	164	59	9	1	-26	138	8.9	3.2	0.5	0.1	-1.4	7.5
1/6/98	112	36	12	0	0	88	6.1	2.0	0.6	0.0	0.0	4.8
1/7/98	73	55	51	0	50	19	4.0	3.0	2.8	0.0	2.7	1.0
1/8/98	73	132	10	1	31	-81	4.0	7.2	0.5	0.0	1.7	-4.4
1/9/98	53	134	8	1	-15	-58	2.9	7.3	0.4	0.0	-0.8	-3.1
1/10/98	37	102	0	2	-18	-50	2.0	5.6	0.0	0.1	-1.0	-2.7
1/11/98	37	81	0	2	-13	-33	2.0	4.4	0.0	0.1	-0.7	-1.8
1/12/98	37	70	0	1	-7	-27	2.0	3.8	0.0	0.0	-0.4	-1.4
1/13/98	33	62	1	2	-2	-29	1.8	3.4	0.0	0.1	-0.1	-1.6
1/14/98	23	52	1	3	-24	-8	1.2	2.8	0.0	0.1	-1.3	-0.4
1/15/98	153	51	3	0	59	46	8.3	2.8	0.1	0.0	3.2	2.5
1/16/98	269	203	1	1	64	2	14.7	11.1	0.0	0.0	3.5	0.1
1/17/98	226	246	3	0	2	-19	12.3	13.4	0.2	0.0	0.1	-1.0
1/18/98	235	242	0	0	0	-8	12.8	13.2	0.0	0.0	0.0	-0.4
1/19/98	200	224	0	2	-18	-8	10.9	12.2	0.0	0.1	-1.0	-0.4
1/20/98	254	223	0	1	18	12	13.8	12.2	0.0	0.0	1.0	0.7
1/21/98	249	243	1	1	0	6	13.5	13.2	0.1	0.0	0.0	0.3
1/22/98	247	254	7	0	9	-9	13.5	13.8	0.4	0.0	0.5	-0.5
1/23/98	246	292	10	0	9	-46	13.4	15.9	0.6	0.0	0.5	-2.5
1/24/98	222	263	0	1	-20	-22	12.1	14.3	0.0	0.0	-1.1	-1.2
1/25/98	224	234	0	1	-2	-9	12.2	12.8	0.0	0.1	-0.1	-0.5
1/26/98	232	237	0	2	2	-9	12.7	12.9	0.0	0.1	0.1	-0.5
1/27/98	269	256	0	2	20	-9	14.7	13.9	0.0	0.1	1.1	-0.5
1/28/98	289	316	0	3	9	-39	15.8	17.2	0.0	0.2	0.5	-2.1
1/29/98	285	320	0	2	7	-44	15.5	17.4	0.0	0.1	0.4	-2.4
1/30/98	281	321	0	2	0	-42	15.3	17.5	0.0	0.1	0.0	-2.3
1/31/98	276	330	0	1	30	-85	15.0	18.0	0.0	0.1	1.6	-4.6
2/1/98	205	241	0	8	-7	-38	11.1	13.2	0.0	0.4	-0.4	-2.1
2/2/98	198	225	0	7	-7	-27	10.8	12.3	0.0	0.4	-0.4	-1.5
2/3/98	186	208	0	4	-9	-17	10.2	11.3	0.0	0.2	-0.5	-0.9
2/4/98	114	163	2	1	-33	-15	6.2	8.9	0.1	0.0	-1.8	-0.8
2/5/98	126	136	10	2	2	-4	6.9	7.4	0.5	0.1	0.1	-0.2
2/6/98	104	130	10	8	-7	-17	5.7	7.1	0.5	0.4	-0.4	-0.9
2/7/98	109	114	0	10	-11	-4	5.9	6.2	0.0	0.6	-0.6	-0.2
2/8/98	63	102	0	8	-2	-45	3.5	5.6	0.0	0.5	-0.1	-2.4
2/9/98	109	102	0	9	0	-2	5.9	5.6	0.0	0.5	0.0	-0.1
2/10/98	153	105	3	7	2	42	8.4	5.7	0.1	0.4	0.1	2.3
2/11/98	135	117	14	1	15	15	7.3	6.4	0.8	0.1	0.8	0.8
2/12/98	111	136	3	2	-7	-17	6.0	7.4	0.2	0.1	-0.4	-0.9
2/13/98	104	108	0	6	-11	2	5.7	5.9	0.0	0.3	-0.6	0.1
2/14/98	98	99	0	9	-7	-3	5.4	5.4	0.0	0.5	-0.4	-0.2
2/15/98	116	88	2	9	2	19	6.3	4.8	0.1	0.5	0.1	1.0
2/16/98	165	125	11	2	35	15	9.0	6.8	0.6	0.1	1.9	0.8
2/17/98	154	177	16	1	16	-23	8.4	9.6	0.9	0.1	0.8	-1.3
2/18/98	414	346	30	1	132	-33	22.6	18.9	1.7	0.0	7.2	-1.8

Date	Wetland 1, gpm						Wetland 1, cm					
	Inf	Outf	Precip	Evap	DVol	Seepage	Inf	Outf	Precip	Evap	DVol	Seepage
2/19/98	563	538	0	1	24	0	30.7	29.3	0.0	0.1	1.3	0.0
2/20/98	554	545	2	3	9	0	30.2	29.7	0.1	0.1	0.5	0.0
2/21/98	531	523	0	4	4	0	29.0	28.5	0.0	0.2	0.2	0.0
2/22/98	531	522	0	7	2	0	29.0	28.5	0.0	0.4	0.1	0.0
2/23/98	531	527	2	2	4	0	29.0	28.7	0.1	0.1	0.2	0.0
2/24/98	518	523	2	3	-7	0	28.2	28.5	0.1	0.2	-0.4	0.0
2/25/98	516	525	0	10	-20	0	28.1	28.6	0.0	0.6	-1.1	0.0
2/26/98	492	492	0	8	-7	0	26.8	26.8	0.0	0.4	-0.4	0.0
2/27/98	429	442	2	9	-20	0	23.4	24.1	0.1	0.5	-1.1	0.0
2/28/98	297	306	0	6	-16	0	16.2	16.7	0.0	0.3	-0.9	0.0
3/1/98	297	310	1	6	-18	0	16.2	16.9	0.0	0.3	-1.0	0.0
3/2/98	297	309	0	6	-18	0	16.2	16.9	0.0	0.3	-1.0	0.0
3/3/98	287	298	2	2	-11	0	15.6	16.3	0.1	0.1	-0.6	0.0
3/4/98	270	272	2	3	-2	0	14.7	14.8	0.1	0.2	-0.1	0.0
3/5/98	267	262	0	5	0	0	14.6	14.3	0.0	0.3	0.0	0.0
3/6/98	266	261	0	7	-2	0	14.5	14.2	0.0	0.4	-0.1	0.0
3/7/98	241	236	2	7	0	0	13.1	12.9	0.1	0.4	0.0	0.0
3/8/98	241	251	12	2	0	0	13.1	13.7	0.7	0.1	0.0	0.0
3/9/98	241	254	12	2	-2	0	13.1	13.8	0.7	0.1	-0.1	0.0
3/10/98	241	236	0	6	0	0	13.1	12.8	0.0	0.3	0.0	0.0
3/11/98	155	203	0	7	-41	-15	8.4	11.1	0.0	0.4	-2.2	-0.8
3/12/98	198	215	0	6	0	-23	10.8	11.7	0.0	0.3	0.0	-1.3
3/13/98	192	209	0	7	-2	-21	10.5	11.4	0.0	0.4	-0.1	-1.2
3/14/98	193	203	0	8	-4	-14	10.5	11.1	0.0	0.4	-0.2	-0.8
3/15/98	193	196	0	8	-2	-10	10.5	10.7	0.0	0.4	-0.1	-0.5
3/16/98	189	191	1	8	0	-9	10.3	10.4	0.1	0.5	0.0	-0.5
3/17/98	187	191	7	2	0	2	10.2	10.4	0.4	0.1	0.0	0.1
3/18/98	180	191	8	3	0	-5	9.8	10.4	0.4	0.1	0.0	-0.3
3/19/98	174	191	1	5	0	-20	9.5	10.4	0.1	0.3	0.0	-1.1
3/20/98	158	189	8	2	-7	-18	8.6	10.3	0.4	0.1	-0.4	-1.0
3/21/98	116	164	12	2	-16	-22	6.3	8.9	0.7	0.1	-0.8	-1.2
3/22/98	116	132	0	5	-18	-4	6.3	7.2	0.0	0.3	-1.0	-0.2
3/23/98	546	210	2	7	114	216	29.8	11.5	0.1	0.4	6.2	11.8
3/24/98	804	602	0	9	107	86	43.8	32.8	0.0	0.5	5.8	4.7
3/25/98	811	811	0	5	15	-21	44.2	44.2	0.0	0.3	0.8	-1.1
3/26/98	812	812	0	12	-4	-7	44.2	44.2	0.0	0.6	-0.2	-0.4
3/27/98	504	736	0	10	-95	-147	27.5	40.1	0.0	0.5	-5.2	-8.0
3/28/98	300	292	0	6	-71	72	16.3	15.9	0.0	0.3	-3.9	3.9
3/29/98	302	265	0	7	-39	69	16.5	14.4	0.0	0.4	-2.1	3.8
3/30/98	305	254	0	7	-7	50	16.6	13.8	0.0	0.4	-0.4	2.7
3/31/98	307	256	0	8	18	25	16.8	14.0	0.0	0.4	1.0	1.4
4/1/98	247	211	12	2	-2	49	13.5	11.5	0.7	0.1	-0.1	2.7
4/2/98	199	170	0	2	-33	61	10.9	9.2	0.0	0.1	-1.8	3.3
4/3/98	105	96	2	2	-35	45	5.7	5.2	0.1	0.1	-1.9	2.5
4/4/98	91	67	2	2	-18	41	5.0	3.7	0.1	0.1	-1.0	2.2
4/5/98	91	50	0	3	-15	53	5.0	2.7	0.0	0.2	-0.8	2.9
4/6/98	91	36	6	3	-11	69	5.0	2.0	0.3	0.2	-0.6	3.7
4/7/98	157	42	34	2	57	90	8.6	2.3	1.9	0.1	3.1	4.9
4/8/98	290	230	40	2	81	17	15.8	12.6	2.2	0.1	4.4	0.9
4/9/98	188	206	37	1	-25	43	10.3	11.2	2.0	0.1	-1.4	2.4

Date	Wetland 1, gpm						Wetland 1, cm					
	Inf	Outf	Precip	Evap	DVol	Seepage	Inf	Outf	Precip	Evap	DVol	Seepage
4/10/98	268	228	0	3	16	21	14.6	12.4	0.0	0.2	0.9	1.1
4/11/98	367	279	0	3	48	37	20.0	15.2	0.0	0.2	2.6	2.0
4/12/98	382	351	0	3	-25	53	20.8	19.2	0.0	0.2	-1.4	2.9
4/13/98	315	273	1	3	-16	56	17.1	14.9	0.1	0.1	-0.9	3.1
4/14/98	208	231	7	1	-23	6	11.3	12.6	0.4	0.1	-1.2	0.3
4/15/98	141	166	36	2	-2	11	7.7	9.1	2.0	0.1	-0.1	0.6
4/16/98	374	359	86	2	120	-21	20.4	19.6	4.7	0.1	6.5	-1.1
4/17/98	709	719	0	3	33	-45	38.7	39.2	0.0	0.2	1.8	-2.5
4/18/98	519	589	5	2	-55	-13	28.3	32.1	0.2	0.1	-3.0	-0.7
4/19/98	246	358	23	1	-64	-27	13.4	19.5	1.2	0.0	-3.5	-1.5
4/20/98	215	241	2	3	-23	-5	11.7	13.2	0.1	0.2	-1.2	-0.2
4/21/98	472	328	10	2	111	41	25.7	17.9	0.6	0.1	6.0	2.2
4/22/98	679	717	6	2	39	-74	37.0	39.1	0.3	0.1	2.1	-4.0
4/23/98	597	715	0	3	-9	-112	32.5	39.0	0.0	0.2	-0.5	-6.1
4/24/98	595	747	0	3	-4	-150	32.4	40.7	0.0	0.2	-0.2	-8.2
4/25/98	157	425	6	2	-151	-114	8.6	23.2	0.3	0.1	-8.2	-6.2
4/26/98	114	159	30	1	-27	11	6.2	8.6	1.6	0.1	-1.5	0.6
4/27/98	84	109	4	3	-31	7	4.6	5.9	0.2	0.2	-1.7	0.4
4/28/98	76	74	1	3	-18	16	4.1	4.0	0.0	0.2	-1.0	0.9
4/29/98	75	70	1	3	-18	20	4.1	3.8	0.1	0.2	-1.0	1.1
4/30/98	74	67	2	2	-15	21	4.0	3.7	0.1	0.1	-0.8	1.1
5/1/98	108	118	7	2	0	-4	5.9	6.4	0.4	0.1	0.0	-0.2
5/2/98	104	140	16	1	9	-30	5.7	7.7	0.9	0.1	0.5	-1.7
5/3/98	97	126	15	5	-9	-10	5.3	6.8	0.8	0.3	-0.5	-0.5
5/4/98	190	112	5	7	24	51	10.3	6.1	0.3	0.4	1.3	2.8
5/5/98	307	330	0	6	4	-33	16.7	18.0	0.0	0.3	0.2	-1.8
5/6/98	66	204	1	6	-110	-33	3.6	11.1	0.1	0.3	-6.0	-1.8
5/7/98	54	168	8	2	-15	-93	2.9	9.1	0.4	0.1	-0.8	-5.1
5/8/98	80	146	7	4	-21	-42	4.4	8.0	0.4	0.2	-1.2	-2.3
5/9/98	171	141	4	5	4	25	9.3	7.7	0.2	0.2	0.2	1.4
5/10/98	160	143	4	6	-6	21	8.7	7.8	0.2	0.3	-0.3	1.1
5/11/98	141	120	4	4	-38	59	7.7	6.5	0.2	0.2	-2.1	3.2
5/12/98	143	105	4	7	27	8	7.8	5.7	0.2	0.4	1.5	0.4
5/13/98	103	128	0	7	-23	-7	5.6	7.0	0.0	0.4	-1.3	-0.4
5/14/98	110	104	0	8	-13	11	6.0	5.7	0.0	0.4	-0.7	0.6
5/15/98	86	87	0	8	-17	9	4.7	4.7	0.0	0.4	-0.9	0.5
5/16/98	238	114	0	7	99	17	13.0	6.2	0.0	0.4	5.4	0.9
5/17/98	398	239	0	9	107	42	21.7	13.0	0.0	0.5	5.9	2.3
5/18/98	300	278	0	8	-35	49	16.3	15.1	0.0	0.5	-1.9	2.7
5/19/98	174	187	0	8	-68	47	9.5	10.2	0.0	0.4	-3.7	2.5
5/20/98	227	189	2	8	26	6	12.4	10.3	0.1	0.4	1.4	0.3
5/21/98	209	197	10	8	-11	24	11.4	10.8	0.6	0.5	-0.6	1.3
5/22/98	132	129	2	7	-2	0	7.2	7.0	0.1	0.4	-0.1	0.0
5/23/98	100	96	11	11	4	0	5.5	5.2	0.6	0.6	0.2	0.0
5/24/98	128	122	8	11	2	0	7.0	6.6	0.4	0.6	0.1	0.0
5/25/98	185	172	1	10	4	0	10.1	9.4	0.1	0.5	0.2	0.0
5/26/98	169	164	1	35	-28	0	9.2	8.9	0.0	1.9	-1.5	0.0
5/27/98	96	68	0	34	-6	0	5.2	3.7	0.0	1.8	-0.4	0.0
5/28/98	84	37	7	31	22	0	4.6	2.0	0.4	1.7	1.2	0.0
5/29/98	83	41	13	29	26	0	4.5	2.2	0.7	1.6	1.4	0.0

Date	Wetland 1, gpm						Wetland 1, cm					
	Inf	Outf	Precip	Evap	DVol	Seepage	Inf	Outf	Precip	Evap	DVol	Seepage
5/30/98	82	47	20	27	28	0	4.5	2.5	1.1	1.5	1.5	0.0
5/31/98	82	57	26	25	26	0	4.5	3.1	1.4	1.4	1.4	0.0
6/1/98	123	124	1	8	-9	0	6.7	6.8	0.1	0.5	-0.5	0.0
6/2/98	139	107	1	11	22	0	7.6	5.8	0.0	0.6	1.2	0.0
6/3/98	128	83	0	23	22	0	7.0	4.5	0.0	1.2	1.2	0.0
6/4/98	123	95	0	20	9	0	6.7	5.2	0.0	1.1	0.5	0.0
6/5/98	105	103	0	5	-2	0	5.7	5.6	0.0	0.2	-0.1	0.0
6/6/98	99	86	0	15	-2	0	5.4	4.7	0.0	0.8	-0.1	0.0
6/7/98	96	78	0	26	-7	0	5.3	4.3	0.0	1.4	-0.4	0.0
6/8/98	91	67	0	42	-18	0	5.0	3.7	0.0	2.3	-1.0	0.0
6/9/98	89	67	0	43	-20	0	4.8	3.6	0.0	2.3	-1.1	0.0
6/10/98	94	76	1	32	-13	0	5.1	4.1	0.0	1.7	-0.7	0.0
6/11/98	118	61	1	23	36	0	6.4	3.4	0.1	1.2	1.9	0.0
6/12/98	202	145	2	8	50	0	11.0	7.9	0.1	0.5	2.7	0.0
6/13/98	265	241	0	7	16	0	14.4	13.1	0.0	0.4	0.9	0.0
6/14/98	418	386	0	7	25	0	22.8	21.1	0.0	0.4	1.4	0.0
6/15/98	476	409	0	4	11	52	26.0	22.3	0.0	0.2	0.6	2.8
6/16/98	572	428	0	5	-27	167	31.2	23.3	0.0	0.3	-1.5	9.1
6/17/98	559	402	0	9	-16	164	30.5	21.9	0.0	0.5	-0.9	8.9
6/18/98	551	377	0	8	-14	180	30.0	20.6	0.0	0.4	-0.7	9.8
6/19/98	456	352	0	8	-45	142	24.9	19.2	0.0	0.4	-2.5	7.7
6/20/98	375	298	0	8	-29	98	20.4	16.2	0.0	0.4	-1.6	5.4
6/21/98	346	301	0	4	29	12	18.9	16.4	0.0	0.2	1.6	0.6
6/22/98	310	274	0	8	-62	91	16.9	14.9	0.0	0.4	-3.4	4.9
6/23/98	259	239	0	5	4	10	14.1	13.1	0.0	0.3	0.2	0.6
6/24/98	205	270	0	9	15	-89	11.2	14.7	0.0	0.5	0.8	-4.8
6/25/98	145	265	0	8	-13	-114	7.9	14.4	0.0	0.4	-0.7	-6.2
6/26/98	86	215	1	6	-40	-94	4.7	11.7	0.1	0.3	-2.2	-5.1
6/27/98	65	208	0	7	-13	-137	3.5	11.3	0.0	0.4	-0.7	-7.5
6/28/98	65	201	1	6	57	-198	3.6	11.0	0.0	0.3	3.1	-10.8
6/29/98	63	217	1	5	117	-275	3.4	11.8	0.1	0.3	6.4	-15.0
6/30/98	64	245	2	5	176	-360	3.5	13.4	0.1	0.3	9.6	-19.6
7/1/98	584	395	0	9	5	176	31.8	21.5	0.0	0.5	0.2	9.6
7/2/98	548	409	0	13	11	115	29.8	22.3	0.0	0.7	0.6	6.3
7/3/98	545	411	0	13	-7	129	29.7	22.4	0.0	0.7	-0.4	7.0
7/4/98	415	407	1	12	-2	-1	22.6	22.2	0.0	0.6	-0.1	-0.1
7/5/98	421	404	0	19	0	-2	23.0	22.0	0.0	1.0	0.0	-0.1
7/6/98	482	408	0	11	-2	65	26.2	22.2	0.0	0.6	-0.1	3.6
7/7/98	325	370	0	7	-64	11	17.7	20.2	0.0	0.4	-3.5	0.6
7/8/98	262	299	0	15	-11	-41	14.3	16.3	0.0	0.8	-0.6	-2.2
7/9/98	347	303	0	17	-22	50	18.9	16.5	0.0	0.9	-1.2	2.7
7/10/98	255	254	0	14	-38	25	13.9	13.8	0.0	0.8	-2.0	1.3
7/11/98	260	237	0	14	-4	14	14.2	12.9	0.0	0.7	-0.2	0.8
7/12/98	260	231	0	13	-7	23	14.2	12.6	0.0	0.7	-0.4	1.2
7/13/98	250	223	0	12	-7	22	13.6	12.1	0.0	0.6	-0.4	1.2
7/14/98	229	225	0	5	7	-8	12.5	12.3	0.0	0.3	0.4	-0.4
7/15/98	222	226	0	14	-2	-15	12.1	12.3	0.0	0.7	-0.1	-0.8
7/16/98	209	214	0	26	-67	36	11.4	11.7	0.0	1.4	-3.7	2.0
7/17/98	77	157	0	23	0	-103	4.2	8.5	0.0	1.3	0.0	-5.6

Date	Wetland 1, gpm						Wetland 1, cm					
	Inf	Outf	Precip	Evap	DVol	Seepage	Inf	Outf	Precip	Evap	DVol	Seepage
7/18/98	115	155	0	19	-6	-52	6.3	8.4	0.0	1.0	-0.3	-2.8
7/19/98	120	151	1	18	2	-51	6.5	8.2	0.0	1.0	0.1	-2.8
7/20/98	111	156	1	13	0	-57	6.0	8.5	0.0	0.7	0.0	-3.1
7/21/98	97	145	0	12	-13	-47	5.3	7.9	0.0	0.7	-0.7	-2.6
7/22/98	107	142	0	13	-6	-42	5.8	7.8	0.0	0.7	-0.3	-2.3
7/23/98	111	128	0	9	-15	-11	6.1	7.0	0.0	0.5	-0.8	-0.6
7/24/98	101	122	0	16	-6	-31	5.5	6.6	0.0	0.9	-0.3	-1.7
7/25/98	91	110	0	11	-17	-13	5.0	6.0	0.0	0.6	-0.9	-0.7
7/26/98	85	102	0	10	-6	-21	4.6	5.6	0.0	0.5	-0.3	-1.1
7/27/98	83	94	0	11	-11	-12	4.5	5.1	0.0	0.6	-0.6	-0.6
7/28/98	78	86	0	10	-17	-1	4.2	4.7	0.0	0.6	-0.9	-0.1
7/29/98	78	84	0	10	-17	1	4.3	4.6	0.0	0.5	-0.9	0.1
7/30/98	78	81	0	10	-19	6	4.3	4.4	0.0	0.5	-1.0	0.3
7/31/98	80	80	0	9	-15	5	4.3	4.3	0.0	0.5	-0.8	0.3
8/1/98	75	77	0	7	-6	-3	4.1	4.2	0.0	0.4	-0.3	-0.1
8/2/98	65	72	0	6	-6	-7	3.5	3.9	0.0	0.3	-0.3	-0.4
8/3/98	58	72	0	4	4	-23	3.1	3.9	0.0	0.2	0.2	-1.3
8/4/98	56	60	0	3	-28	20	3.0	3.3	0.0	0.2	-1.5	1.1
8/5/98	58	53	0	3	-2	3	3.1	2.9	0.0	0.2	-0.1	0.2
8/6/98	61	55	0	8	8	-10	3.3	3.0	0.0	0.4	0.4	-0.5
8/7/98	61	60	0	7	0	-6	3.3	3.2	0.0	0.4	0.0	-0.3
8/8/98	65	61	0	5	6	-6	3.5	3.3	0.0	0.3	0.3	-0.3
8/9/98	61	60	2	5	-6	4	3.3	3.3	0.1	0.3	-0.3	0.2
8/10/98	109	76	9	8	75	-40	5.9	4.1	0.5	0.4	4.1	-2.2
8/11/98	224	141	0	8	53	23	12.2	7.7	0.0	0.4	2.9	1.3
8/12/98	227	166	0	12	28	21	12.4	9.0	0.0	0.7	1.5	1.1
8/13/98	221	189	0	8	-22	46	12.0	10.3	0.0	0.5	-1.2	2.5
8/14/98	221	174	0	11	39	-3	12.0	9.5	0.0	0.6	2.1	-0.2
8/15/98	153	181	0	6	-48	13	8.3	9.9	0.0	0.3	-2.6	0.7
8/16/98	142	150	0	10	-17	-1	7.8	8.2	0.0	0.5	-0.9	0.0
8/17/98	158	141	0	15	0	3	8.6	7.7	0.0	0.8	0.0	0.1
8/18/98	152	144	0	21	0	-13	8.3	7.8	0.0	1.2	0.0	-0.7
8/19/98	141	138	0	14	-13	2	7.7	7.5	0.0	0.8	-0.7	0.1
8/20/98	139	126	0	12	-8	9	7.6	6.8	0.0	0.7	-0.5	0.5
8/21/98	144	126	0	11	4	3	7.8	6.9	0.0	0.6	0.2	0.2
8/22/98	147	131	0	5	8	2	8.0	7.1	0.0	0.3	0.5	0.1
8/23/98	151	136	1	5	0	11	8.2	7.4	0.1	0.2	0.0	0.6
8/24/98	64	113	12	4	-70	29	3.5	6.1	0.7	0.2	-3.8	1.6
8/25/98	0	56	33	4	-50	24	0.0	3.0	1.8	0.2	-2.8	1.3
8/26/98	0	41	0	6	-21	-25	0.0	2.2	0.0	0.3	-1.1	-1.4
8/27/98	0	24	0	6	-30	0	0.0	1.3	0.0	0.3	-1.6	0.0
8/28/98	56	11	1	5	-17	58	3.0	0.6	0.0	0.3	-0.9	3.1
8/29/98	74	9	2	5	-16	77	4.0	0.5	0.1	0.3	-0.9	4.2
8/30/98	92	7	2	5	-14	96	5.0	0.4	0.1	0.3	-0.8	5.2
8/31/98	109	6	3	5	-12	113	5.9	0.3	0.2	0.3	-0.6	6.2
9/1/98	119	72	0	5	8	34	6.5	3.9	0.0	0.3	0.4	1.8
9/2/98	114	78	0	5	8	23	6.2	4.2	0.0	0.3	0.5	1.3
9/3/98	99	80	0	5	4	10	5.4	4.4	0.0	0.3	0.2	0.5
9/4/98	111	88	0	5	10	7	6.0	4.8	0.0	0.3	0.6	0.4
9/5/98	159	93	0	6	4	57	8.7	5.1	0.0	0.3	0.2	3.1

Date	Wetland 1, gpm						Wetland 1, cm					
	Inf	Outf	Precip	Evap	DVol	Seepage	Inf	Outf	Precip	Evap	DVol	Seepage
9/6/98	83	92	6	4	-6	0	4.5	5.0	0.3	0.2	-0.3	0.0
9/7/98	83	88	12	3	-6	11	4.5	4.8	0.7	0.2	-0.3	0.6
9/8/98	83	83	0	5	-4	-1	4.5	4.5	0.0	0.3	-0.2	-0.1
9/9/98	74	80	0	6	-6	-5	4.0	4.3	0.0	0.3	-0.3	-0.3
9/10/98	66	72	0	6	-12	0	3.6	3.9	0.0	0.3	-0.7	0.0
9/11/98	67	69	0	5	-4	-4	3.6	3.8	0.0	0.3	-0.2	-0.2
9/12/98	67	62	0	5	-8	7	3.6	3.4	0.0	0.3	-0.4	0.4
9/13/98	60	62	0	5	4	-11	3.3	3.4	0.0	0.3	0.2	-0.6
9/14/98	61	62	0	4	-2	-3	3.3	3.4	0.0	0.2	-0.1	-0.2
9/15/98	23	30	0	3	-2	-8	1.3	1.7	0.0	0.2	-0.1	-0.5
9/16/98	0	0	0	3	0	-3	0.0	0.0	0.0	0.2	0.0	-0.2
9/17/98	0	0	0	4	0	-4	0.0	0.0	0.0	0.2	0.0	-0.2
9/18/98	0	0	0	4	0	-4	0.0	0.0	0.0	0.2	0.0	-0.2
9/19/98	0	0	0	4	0	-3	0.0	0.0	0.0	0.2	0.0	-0.2
9/20/98	0	0	0	4	0	-3	0.0	0.0	0.0	0.2	0.0	-0.2
9/21/98	0	0	6	3	0	3	0.0	0.0	0.3	0.2	0.0	0.1
9/22/98	0	0	9	4	0	6	0.0	0.0	0.5	0.2	0.0	0.3
9/23/98	0	0	0	5	0	-5	0.0	0.0	0.0	0.3	0.0	-0.3
9/24/98	0	0	0	4	0	-4	0.0	0.0	0.0	0.2	0.0	-0.2
9/25/98	0	0	0	3	0	-3	0.0	0.0	0.0	0.2	0.0	-0.2
9/26/98	0	0	3	4	0	-1	0.0	0.0	0.2	0.2	0.0	-0.1
9/27/98	0	0	6	4	0	2	0.0	0.0	0.3	0.2	0.0	0.1
9/28/98	0	0	0	5	0	-5	0.0	0.0	0.0	0.3	0.0	-0.3
9/29/98	0	0	0	5	0	-5	0.0	0.0	0.0	0.3	0.0	-0.3
9/30/98	0	0	0	5	0	-5	0.0	0.0	0.0	0.3	0.0	-0.3
10/1/98	0	60	0	2	0	-62	0.0	3.3	0.0	0.1	0.0	-3.4
10/2/98	0	60	6	1	0	-55	0.0	3.3	0.3	0.1	0.0	-3.0
10/3/98	0	60	29	0	0	-31	0.0	3.3	1.6	0.0	0.0	-1.7
10/4/98	0	60	0	1	0	-61	0.0	3.3	0.0	0.0	0.0	-3.3
10/5/98	0	60	0	1	0	-61	0.0	3.3	0.0	0.1	0.0	-3.3
10/6/98	0	60	11	1	0	-51	0.0	3.3	0.6	0.1	0.0	-2.8
10/7/98	0	60	53	0	0	-7	0.0	3.3	2.9	0.0	0.0	-0.4
10/8/98	0	60	0	1	0	-61	0.0	3.3	0.0	0.0	0.0	-3.3
10/9/98	219	66	0	1	69	83	11.9	3.6	0.0	0.1	3.7	4.5
10/10/98	777	242	0	2	213	320	42.4	13.2	0.0	0.1	11.6	17.5
10/11/98	600	384	0	2	78	137	32.7	20.9	0.0	0.1	4.2	7.4
10/12/98	334	563	0	2	114	-346	18.2	30.7	0.0	0.1	6.2	-18.8
10/13/98	289	493	0	2	-212	6	15.7	26.9	0.0	0.1	-11.6	0.3
10/14/98	256	200	0	1	-121	175	13.9	10.9	0.0	0.1	-6.6	9.5
10/15/98	225	190	0	2	7	27	12.2	10.4	0.0	0.1	0.4	1.4
10/16/98	197	155	0	2	-39	79	10.7	8.4	0.0	0.1	-2.1	4.3
10/17/98	219	145	4	1	2	74	12.0	7.9	0.2	0.1	0.1	4.0
10/18/98	230	153	18	1	6	88	12.6	8.3	1.0	0.0	0.3	4.8
10/19/98	172	142	0	2	-23	52	9.4	7.7	0.0	0.1	-1.3	2.8
10/20/98	164	125	0	2	-19	57	8.9	6.8	0.0	0.1	-1.0	3.1
10/21/98	163	117	2	1	11	36	8.9	6.4	0.1	0.1	0.6	2.0
10/22/98	194	137	0	2	23	33	10.6	7.4	0.0	0.1	1.3	1.8
10/23/98	190	145	0	2	0	43	10.3	7.9	0.0	0.1	0.0	2.3
10/24/98	196	144	0	2	-4	54	10.7	7.9	0.0	0.1	-0.2	3.0
10/25/98	150	133	0	1	-21	37	8.2	7.3	0.0	0.1	-1.2	2.0

Date	Wetland 1, gpm						Wetland 1, cm					
	Inf	Outf	Precip	Evap	DVol	Seepage	Inf	Outf	Precip	Evap	DVol	Seepage
10/26/98	184	120	0	1	-4	67	10.0	6.5	0.0	0.1	-0.2	3.7
10/27/98	140	112	0	1	-21	49	7.6	6.1	0.0	0.0	-1.2	2.7
10/28/98	202	107	0	1	40	55	11.0	5.8	0.0	0.0	2.2	3.0
10/29/98	245	114	0	1	65	65	13.4	6.2	0.0	0.0	3.6	3.5
10/30/98	288	126	0	1	91	70	15.7	6.9	0.0	0.1	5.0	3.8
10/31/98	306	139	0	1	91	74	16.7	7.6	0.0	0.1	5.0	4.0
9/1/98	287	159	4	0	37	96	15.6	8.6	0.2	0.0	2.0	5.2
9/2/98	383	229	9	0	50	113	20.9	12.5	0.5	0.0	2.7	6.2
9/3/98	313	236	2	0	-20	98	17.1	12.9	0.1	0.0	-1.1	5.3
9/4/98	206	204	0	0	-71	73	11.2	11.1	0.0	0.0	-3.9	4.0
9/5/98	81	105	0	0	-51	27	4.4	5.7	0.0	0.0	-2.8	1.5
9/6/98	54	104	0	0	-34	-17	2.9	5.6	0.0	0.0	-1.8	-0.9
9/7/98	0	58	0	0	-70	11	0.0	3.2	0.0	0.0	-3.8	0.6
9/8/98	109	39	0	0	51	19	6.0	2.1	0.0	0.0	2.8	1.0
9/9/98	189	97	9	0	67	34	10.3	5.3	0.5	0.0	3.7	1.9
9/10/98	190	144	18	0	34	30	10.4	7.8	1.0	0.0	1.8	1.7
9/11/98	195	149	0	0	13	33	10.7	8.1	0.0	0.0	0.7	1.8
9/12/98	261	174	0	0	22	66	14.2	9.5	0.0	0.0	1.2	3.6
9/13/98	237	189	0	0	9	39	12.9	10.3	0.0	0.0	0.5	2.1
9/14/98	233	182	0	0	-28	79	12.7	9.9	0.0	0.0	-1.5	4.3
9/15/98	232	150	0	0	-21	103	12.7	8.2	0.0	0.0	-1.2	5.6
9/16/98	221	155	0	0	28	38	12.1	8.5	0.0	0.0	1.5	2.1
9/17/98	231	171	0	0	2	58	12.6	9.3	0.0	0.0	0.1	3.2
9/18/98	230	171	0	0	-17	75	12.5	9.3	0.0	0.0	-0.9	4.1
9/19/98	151	143	4	0	-11	23	8.2	7.8	0.2	0.0	-0.6	1.2
9/20/98	151	143	9	0	-4	21	8.2	7.8	0.5	0.0	-0.2	1.1
9/21/98	150	140	0	0	-4	13	8.2	7.7	0.0	0.0	-0.2	0.7
9/22/98	148	134	0	0	-4	18	8.1	7.3	0.0	0.0	-0.2	1.0
9/23/98	147	132	0	0	-4	19	8.0	7.2	0.0	0.0	-0.2	1.0
9/24/98	146	129	7	0	-4	28	8.0	7.0	0.4	0.0	-0.2	1.5
9/25/98	147	127	15	0	2	33	8.0	6.9	0.8	0.0	0.1	1.8
9/26/98	149	130	3	0	2	20	8.1	7.1	0.2	0.0	0.1	1.1
9/27/98	150	132	0	0	2	16	8.2	7.2	0.0	0.0	0.1	0.8
9/28/98	141	129	0	0	-6	19	7.7	7.0	0.0	0.0	-0.3	1.0
9/29/98	138	128	0	0	-2	12	7.5	7.0	0.0	0.0	-0.1	0.7
9/30/98	135	128	0	0	-2	9	7.4	7.0	0.0	0.0	-0.1	0.5
12/1/98	78	105	0	0	-23	-5	4.2	5.7	0.0	0.0	-1.3	-0.2
12/2/98	89	96	0	0	-6	-1	4.8	5.2	0.0	0.0	-0.3	0.0
12/3/98	111	103	0	0	38	-30	6.0	5.6	0.0	0.0	2.1	-1.6
12/4/98	106	139	0	0	6	-39	5.8	7.6	0.0	0.0	0.3	-2.1
12/5/98	105	116	0	0	-23	13	5.7	6.3	0.0	0.0	-1.3	0.7
12/6/98	100	109	3	0	-2	-4	5.5	5.9	0.1	0.0	-0.1	-0.2
12/7/98	84	102	13	0	-21	16	4.6	5.6	0.7	0.0	-1.2	0.9
12/8/98	68	88	0	0	-13	-7	3.7	4.8	0.0	0.0	-0.7	-0.4
12/9/98	70	85	0	0	4	-19	3.8	4.7	0.0	0.0	0.2	-1.0
12/10/98	75	81	0	0	0	-5	4.1	4.4	0.0	0.0	0.0	-0.3
12/11/98	95	99	0	0	15	-19	5.2	5.4	0.0	0.0	0.8	-1.0
12/12/98	116	96	0	0	4	16	6.3	5.3	0.0	0.0	0.2	0.9
12/13/98	118	106	0	0	11	2	6.4	5.8	0.0	0.0	0.6	0.1

Date	Wetland 1, gpm						Wetland 1, cm					
	Inf	Outf	Precip	Evap	DVol	Seepage	Inf	Outf	Precip	Evap	DVol	Seepage
12/14/98	117	108	0	0	0	9	6.4	5.9	0.0	0.0	0.0	0.5
12/15/98	118	108	2	0	0	11	6.4	5.9	0.1	0.0	0.0	0.6
12/16/98	118	110	9	0	4	12	6.4	6.0	0.5	0.0	0.2	0.7
12/17/98	120	112	2	0	0	10	6.5	6.1	0.1	0.0	0.0	0.6
12/18/98	119	113	0	0	2	4	6.5	6.1	0.0	0.0	0.1	0.2
12/19/98	116	115	1	0	0	2	6.3	6.3	0.0	0.0	0.0	0.1
12/20/98	117	112	17	0	-2	24	6.4	6.1	0.9	0.0	-0.1	1.3
12/21/98	104	124	83	0	34	30	5.7	6.8	4.5	0.0	1.8	1.6
12/22/98	81	117	0	0	19	-54	4.4	6.4	0.0	0.0	1.0	-3.0
12/23/98	59	55	0	0	4	0	3.2	3.0	0.0	0.0	0.2	0.0
12/24/98	59	72	0	0	-13	0	3.2	3.9	0.0	0.0	-0.7	0.0
12/25/98	59	74	0	0	-15	0	3.2	4.0	0.0	0.0	-0.8	0.0
12/26/98	58	72	0	0	-15	0	3.1	3.9	0.0	0.0	-0.8	0.0
12/27/98	59	80	0	0	-21	0	3.2	4.3	0.0	0.0	-1.2	0.0
12/28/98	25	76	0	0	-50	0	1.4	4.1	0.0	0.0	-2.7	0.0
12/29/98	15	76	1	0	-60	0	0.8	4.2	0.1	0.0	-3.3	0.0
12/30/98	6	81	1	0	-74	0	0.3	4.4	0.1	0.0	-4.0	0.0
12/31/98	52	79	2	0	-25	0	2.8	4.3	0.1	0.0	-1.4	0.0

Appendix B. Daily hydrologic budget for Wetland 2, 1998

Date	Wetland 2, gpm						Wetland 2, cm					
	Inf	Outf	Precip	Evap	DVol	Seepage	Inf	Outf	Precip	Evap	DVol	Seepage
1/1/98	0	56	0	2	0	-58	0.0	3.1	0.0	0.1	0.0	-3.2
1/2/98	138	56	0	1	0	81	7.5	3.1	0.0	0.0	0.0	4.4
1/3/98	223	56	1	0	0	167	12.2	3.1	0.0	0.0	0.0	9.1
1/4/98	207	56	2	1	0	152	11.3	3.1	0.1	0.0	0.0	8.3
1/5/98	207	56	9	1	0	158	11.3	3.1	0.5	0.1	0.0	8.6
1/6/98	144	55	12	0	-4	105	7.9	3.0	0.6	0.0	-0.2	5.7
1/7/98	97	60	51	0	25	63	5.3	3.3	2.8	0.0	1.4	3.4
1/8/98	83	105	10	1	11	-23	4.5	5.7	0.5	0.0	0.6	-1.3
1/9/98	67	83	8	1	-23	14	3.6	4.5	0.4	0.0	-1.3	0.8
1/10/98	57	59	0	2	-13	8	3.1	3.2	0.0	0.1	-0.7	0.4
1/11/98	50	47	0	2	-8	9	2.7	2.5	0.0	0.1	-0.5	0.5
1/12/98	44	43	0	1	0	0	2.4	2.4	0.0	0.0	0.0	0.0
1/13/98	48	43	1	2	0	2	2.6	2.4	0.0	0.1	0.0	0.1
1/14/98	36	40	1	3	-16	10	2.0	2.2	0.0	0.1	-0.9	0.6
1/15/98	152	35	3	0	48	71	8.3	1.9	0.1	0.0	2.6	3.9
1/16/98	268	155	1	1	56	56	14.6	8.5	0.0	0.0	3.0	3.1
1/17/98	221	170	3	0	-7	61	12.0	9.2	0.2	0.0	-0.4	3.3
1/18/98	239	174	0	0	4	60	13.0	9.5	0.0	0.0	0.2	3.3
1/19/98	197	151	0	2	-17	62	10.7	8.2	0.0	0.1	-0.9	3.4
1/20/98	232	156	0	1	15	60	12.7	8.5	0.0	0.0	0.8	3.3
1/21/98	187	177	1	1	7	4	10.2	9.6	0.1	0.0	0.4	0.2
1/22/98	196	190	7	0	9	4	10.7	10.3	0.4	0.0	0.5	0.2

Date	Wetland 2, gpm						Wetland 2, cm					
	Inf	Outf	Precip	Evap	DVol	Seepage	Inf	Outf	Precip	Evap	DVol	Seepage
1/23/98	200	218	10	0	7	-14	10.9	11.9	0.6	0.0	0.4	-0.8
1/24/98	185	200	0	1	-11	-4	10.1	10.9	0.0	0.0	-0.6	-0.2
1/25/98	189	197	0	1	2	-12	10.3	10.8	0.0	0.1	0.1	-0.6
1/26/98	196	191	0	2	-7	9	10.7	10.4	0.0	0.1	-0.4	0.5
1/27/98	242	194	0	2	18	28	13.2	10.6	0.0	0.1	1.0	1.5
1/28/98	255	248	0	3	13	-8	13.9	13.5	0.0	0.2	0.7	-0.4
1/29/98	246	252	0	2	9	-17	13.4	13.7	0.0	0.1	0.5	-0.9
1/30/98	237	253	0	2	2	-20	12.9	13.8	0.0	0.1	0.1	-1.1
1/31/98	234	253	0	1	-2	-18	12.8	13.8	0.0	0.1	-0.1	-1.0
2/1/98	222	230	0	8	-4	-12	12.1	12.5	0.0	0.4	-0.2	-0.7
2/2/98	220	220	0	7	-4	-3	12.0	12.0	0.0	0.4	-0.2	-0.2
2/3/98	211	207	0	4	-7	6	11.5	11.3	0.0	0.2	-0.4	0.3
2/4/98	118	157	2	1	-37	-1	6.4	8.5	0.1	0.0	-2.0	-0.1
2/5/98	103	131	10	2	4	-24	5.6	7.2	0.5	0.1	0.2	-1.3
2/6/98	80	129	10	8	-4	-43	4.4	7.1	0.5	0.4	-0.2	-2.3
2/7/98	83	119	0	10	-4	-42	4.5	6.5	0.0	0.6	-0.2	-2.3
2/8/98	75	115	0	8	0	-49	4.1	6.3	0.0	0.5	0.0	-2.6
2/9/98	88	116	0	9	0	-37	4.8	6.3	0.0	0.5	0.0	-2.0
2/10/98	99	119	3	7	2	-26	5.4	6.5	0.1	0.4	0.1	-1.4
2/11/98	100	130	14	1	11	-28	5.5	7.1	0.8	0.1	0.6	-1.5
2/12/98	87	133	3	2	-9	-36	4.8	7.3	0.2	0.1	-0.5	-1.9
2/13/98	78	116	0	6	-9	-35	4.3	6.3	0.0	0.3	-0.5	-1.9
2/14/98	68	102	0	9	-6	-37	3.7	5.6	0.0	0.5	-0.3	-2.0
2/15/98	102	98	2	9	4	-7	5.6	5.4	0.1	0.5	0.2	-0.4
2/16/98	190	132	11	2	28	39	10.4	7.2	0.6	0.1	1.5	2.1
2/17/98	181	184	16	1	20	-8	9.9	10.1	0.9	0.1	1.1	-0.4
2/18/98	417	327	30	1	109	11	22.7	17.8	1.7	0.0	5.9	0.6
2/19/98	535	513	0	1	21	0	29.2	28.0	0.0	0.1	1.1	0.0
2/20/98	530	532	2	3	-2	0	28.9	29.0	0.1	0.1	-0.1	0.0
2/21/98	512	510	0	4	-2	0	27.9	27.8	0.0	0.2	-0.1	0.0
2/22/98	512	507	0	7	-2	0	27.9	27.6	0.0	0.4	-0.1	0.0
2/23/98	512	514	2	2	-2	0	27.9	28.0	0.1	0.1	-0.1	0.0
2/24/98	505	508	2	3	-5	0	27.5	27.7	0.1	0.2	-0.3	0.0
2/25/98	506	500	0	10	-5	0	27.6	27.3	0.0	0.6	-0.3	0.0
2/26/98	483	474	0	8	2	0	26.4	25.8	0.0	0.4	0.1	0.0
2/27/98	412	426	2	9	-21	0	22.5	23.2	0.1	0.5	-1.1	0.0
2/28/98	326	338	0	6	-18	0	17.8	18.4	0.0	0.3	-1.0	0.0
3/1/98	326	380	1	6	-16	-43	17.8	20.7	0.0	0.3	-0.9	-2.3
3/2/98	326	330	0	6	-16	6	17.8	18.0	0.0	0.3	-0.9	0.3
3/3/98	310	294	2	2	-5	21	16.9	16.0	0.1	0.1	-0.2	1.1
3/4/98	295	298	2	3	0	-3	16.1	16.2	0.1	0.2	0.0	-0.2
3/5/98	292	290	0	5	0	-4	15.9	15.8	0.0	0.3	0.0	-0.2
3/6/98	284	288	0	7	-4	-7	15.5	15.7	0.0	0.4	-0.2	-0.4
3/7/98	254	269	2	7	-9	-11	13.8	14.7	0.1	0.4	-0.5	-0.6
3/8/98	254	245	12	2	-9	28	13.8	13.3	0.7	0.1	-0.5	1.5
3/9/98	254	221	12	2	-11	54	13.8	12.1	0.7	0.1	-0.6	2.9
3/10/98	254	199	0	6	-9	58	13.8	10.9	0.0	0.3	-0.5	3.1
3/11/98	152	168	0	7	-22	-1	8.3	9.2	0.0	0.4	-1.2	-0.1
3/12/98	174	137	0	6	0	31	9.5	7.5	0.0	0.3	0.0	1.7

Date	Wetland 2, gpm						Wetland 2, cm					
	Inf	Outf	Precip	Evap	DVol	Seepage	Inf	Outf	Precip	Evap	DVol	Seepage
3/13/98	168	155	0	7	11	-5	9.1	8.5	0.0	0.4	0.6	-0.3
3/14/98	167	171	0	8	7	-18	9.1	9.3	0.0	0.4	0.4	-1.0
3/15/98	167	186	0	8	7	-33	9.1	10.1	0.0	0.4	0.4	-1.8
3/16/98	168	195	1	8	-2	-32	9.2	10.7	0.1	0.5	-0.1	-1.7
3/17/98	186	183	7	2	-2	11	10.1	10.0	0.4	0.1	-0.1	0.6
3/18/98	193	189	8	3	2	7	10.5	10.3	0.4	0.1	0.1	0.4
3/19/98	184	183	1	5	-4	2	10.0	10.0	0.1	0.3	-0.2	0.1
3/20/98	162	173	8	2	-7	2	8.8	9.4	0.4	0.1	-0.4	0.1
3/21/98	103	149	12	2	-15	-21	5.6	8.1	0.7	0.1	-0.8	-1.2
3/22/98	103	122	0	5	-15	-9	5.6	6.7	0.0	0.3	-0.8	-0.5
3/23/98	422	219	2	7	122	76	23.0	11.9	0.1	0.4	6.7	4.1
3/24/98	835	487	0	9	46	294	45.5	26.5	0.0	0.5	2.5	16.0
3/25/98	845	657	0	5	33	150	46.1	35.8	0.0	0.3	1.8	8.2
3/26/98	831	775	0	12	22	23	45.3	42.2	0.0	0.6	1.2	1.3
3/27/98	526	716	0	10	-94	-106	28.7	39.0	0.0	0.5	-5.1	-5.8
3/28/98	193	262	0	6	-68	-7	10.5	14.3	0.0	0.3	-3.7	-0.4
3/29/98	221	238	0	7	-36	13	12.1	13.0	0.0	0.4	-2.0	0.7
3/30/98	249	229	0	7	-2	15	13.6	12.5	0.0	0.4	-0.1	0.8
3/31/98	273	233	0	8	22	10	14.9	12.7	0.0	0.4	1.2	0.5
4/1/98	252	179	12	2	0	83	13.7	9.7	0.7	0.1	0.0	4.5
4/2/98	203	151	0	2	-33	83	11.0	8.2	0.0	0.1	-1.8	4.5
4/3/98	107	84	2	2	-28	51	5.8	4.6	0.1	0.1	-1.5	2.8
4/4/98	88	65	2	2	-13	36	4.8	3.5	0.1	0.1	-0.7	2.0
4/5/98	88	51	0	3	-13	47	4.8	2.8	0.0	0.2	-0.7	2.6
4/6/98	86	39	6	3	-11	60	4.7	2.1	0.3	0.2	-0.6	3.3
4/7/98	147	43	34	2	51	86	8.0	2.3	1.9	0.1	2.8	4.7
4/8/98	302	212	40	2	73	55	16.5	11.6	2.2	0.1	4.0	3.0
4/9/98	176	189	37	1	-25	47	9.6	10.3	2.0	0.1	-1.3	2.5
4/10/98	272	198	0	3	7	65	14.8	10.8	0.0	0.2	0.4	3.5
4/11/98	387	235	0	3	52	96	21.1	12.8	0.0	0.2	2.9	5.2
4/12/98	412	302	0	3	-32	140	22.5	16.4	0.0	0.2	-1.8	7.6
4/13/98	346	224	1	3	-11	132	18.9	12.2	0.1	0.1	-0.6	7.2
4/14/98	204	197	7	1	-18	30	11.1	10.7	0.4	0.1	-1.0	1.7
4/15/98	127	147	36	2	-2	16	6.9	8.0	2.0	0.1	-0.1	0.9
4/16/98	390	306	86	2	110	58	21.3	16.7	4.7	0.1	6.0	3.2
4/17/98	783	602	0	3	31	148	42.7	32.8	0.0	0.2	1.7	8.1
4/18/98	579	494	5	2	-54	142	31.6	26.9	0.2	0.1	-2.9	7.7
4/19/98	281	293	23	1	-62	72	15.3	16.0	1.2	0.0	-3.4	3.9
4/20/98	246	203	2	3	-16	57	13.4	11.1	0.1	0.2	-0.8	3.1
4/21/98	533	309	10	2	124	108	29.0	16.8	0.6	0.1	6.8	5.9
4/22/98	782	698	6	2	38	50	42.7	38.0	0.3	0.1	2.1	2.7
4/23/98	694	654	0	3	-22	59	37.8	35.6	0.0	0.2	-1.2	3.2
4/24/98	691	643	0	3	-43	88	37.7	35.0	0.0	0.2	-2.3	4.8
4/25/98	168	233	6	2	-118	57	9.1	12.7	0.3	0.1	-6.4	3.1
4/26/98	115	136	30	1	-9	16	6.3	7.4	1.6	0.1	-0.5	0.9
4/27/98	82	114	4	3	-17	-14	4.5	6.2	0.2	0.2	-0.9	-0.8
4/28/98	71	95	1	3	-13	-14	3.9	5.2	0.0	0.2	-0.7	-0.7
4/29/98	70	92	1	3	-17	-7	3.8	5.0	0.1	0.2	-0.9	-0.4
4/30/98	68	88	2	2	-19	-1	3.7	4.8	0.1	0.1	-1.1	-0.1

Date	Wetland 2, gpm						Wetland 2, cm					
	Inf	Outf	Precip	Evap	DVol	Seepage	Inf	Outf	Precip	Evap	DVol	Seepage
5/1/98	94	111	7	2	-4	-8	5.1	6.0	0.4	0.1	-0.2	-0.4
5/2/98	73	125	16	1	4	-42	4.0	6.8	0.9	0.1	0.2	-2.3
5/3/98	64	105	15	5	-11	-20	3.5	5.7	0.8	0.3	-0.6	-1.1
5/4/98	181	112	5	7	48	19	9.9	6.1	0.3	0.4	2.6	1.1
5/5/98	334	330	0	6	-52	51	18.2	18.0	0.0	0.3	-2.8	2.8
5/6/98	47	169	1	6	-148	21	2.6	9.2	0.1	0.3	-8.1	1.2
5/7/98	32	113	8	2	-18	-58	1.7	6.2	0.4	0.1	-1.0	-3.1
5/8/98	132	89	7	4	-22	67	7.2	4.9	0.4	0.2	-1.2	3.7
5/9/98	171	84	4	5	4	82	9.3	4.6	0.2	0.2	0.2	4.5
5/10/98	160	87	4	6	6	64	8.7	4.8	0.2	0.3	0.3	3.5
5/11/98	141	96	4	4	12	33	7.7	5.2	0.2	0.2	0.6	1.8
5/12/98	143	105	4	7	2	33	7.8	5.7	0.2	0.4	0.1	1.8
5/13/98	103	92	0	7	-27	33	5.6	5.0	0.0	0.4	-1.5	1.8
5/14/98	110	78	0	8	-10	35	6.0	4.2	0.0	0.4	-0.5	1.9
5/15/98	86	60	0	8	-19	39	4.7	3.2	0.0	0.4	-1.1	2.1
5/16/98	238	79	0	7	93	59	13.0	4.3	0.0	0.4	5.1	3.2
5/17/98	398	230	0	9	115	44	21.7	12.6	0.0	0.5	6.3	2.4
5/18/98	299	271	0	8	-40	60	16.3	14.8	0.0	0.5	-2.2	3.3
5/19/98	175	169	0	8	-71	70	9.5	9.2	0.0	0.4	-3.9	3.8
5/20/98	237	160	2	8	24	47	12.9	8.7	0.1	0.4	1.3	2.6
5/21/98	185	173	10	8	-18	32	10.1	9.4	0.6	0.5	-1.0	1.8
5/22/98	86	89	2	7	-8	0	4.7	4.9	0.1	0.4	-0.4	0.0
5/23/98	50	44	11	11	6	0	2.7	2.4	0.6	0.6	0.3	0.0
5/24/98	81	71	8	11	6	0	4.4	3.9	0.4	0.6	0.3	0.0
5/25/98	147	133	1	10	6	0	8.0	7.2	0.1	0.5	0.3	0.0
5/26/98	136	110	1	35	-8	0	7.4	6.0	0.0	1.9	-0.4	0.0
5/27/98	89	54	0	34	2	0	4.9	2.9	0.0	1.8	0.1	0.0
5/28/98	72	37	7	31	10	0	3.9	2.0	0.4	1.7	0.6	0.0
5/29/98	71	42	13	29	12	0	3.9	2.3	0.7	1.6	0.7	0.0
5/30/98	69	50	20	27	12	0	3.8	2.7	1.1	1.5	0.7	0.0
5/31/98	69	62	26	25	8	0	3.7	3.4	1.4	1.4	0.4	0.0
6/1/98	127	124	1	8	-4	0	6.9	6.8	0.1	0.5	-0.2	0.0
6/2/98	141	109	1	11	21	0	7.7	6.0	0.0	0.6	1.2	0.0
6/3/98	132	92	0	23	17	0	7.2	5.0	0.0	1.2	0.9	0.0
6/4/98	128	107	0	20	2	0	7.0	5.8	0.0	1.1	0.1	0.0
6/5/98	101	103	0	5	-6	0	5.5	5.6	0.0	0.2	-0.3	0.0
6/6/98	96	83	0	15	-2	0	5.2	4.5	0.0	0.8	-0.1	0.0
6/7/98	92	69	0	26	-2	0	5.0	3.8	0.0	1.4	-0.1	0.0
6/8/98	87	60	0	42	-15	0	4.7	3.3	0.0	2.3	-0.8	0.0
6/9/98	84	63	0	43	-21	0	4.6	3.4	0.0	2.3	-1.1	0.0
6/10/98	91	62	1	32	-2	0	5.0	3.4	0.0	1.7	-0.1	0.0
6/11/98	125	80	1	23	23	0	6.8	4.4	0.1	1.2	1.3	0.0
6/12/98	245	191	2	8	47	0	13.3	10.4	0.1	0.5	2.6	0.0
6/13/98	315	292	0	7	15	0	17.2	15.9	0.0	0.4	0.8	0.0
6/14/98	450	408	0	7	35	0	24.5	22.2	0.0	0.4	1.9	0.0
6/15/98	560	445	0	4	13	97	30.5	24.3	0.0	0.2	0.7	5.3
6/16/98	668	433	0	5	-22	253	36.4	23.6	0.0	0.3	-1.2	13.8
6/17/98	636	404	0	9	-18	240	34.7	22.0	0.0	0.5	-1.0	13.1
6/18/98	611	379	0	8	-11	235	33.3	20.7	0.0	0.4	-0.6	12.8

Date	Wetland 2, gpm						Wetland 2, cm					
	Inf	Outf	Precip	Evap	DVol	Seepage	Inf	Outf	Precip	Evap	DVol	Seepage
6/19/98	479	348	0	8	-32	155	26.1	19.0	0.0	0.4	-1.8	8.5
6/20/98	392	289	0	8	-57	152	21.4	15.8	0.0	0.4	-3.1	8.3
6/21/98	359	259	0	4	23	73	19.6	14.1	0.0	0.2	1.3	4.0
6/22/98	314	244	0	8	-39	102	17.1	13.3	0.0	0.4	-2.2	5.6
6/23/98	254	212	0	5	-4	42	13.8	11.5	0.0	0.3	-0.2	2.3
6/24/98	195	232	0	9	10	-56	10.6	12.7	0.0	0.5	0.6	-3.1
6/25/98	117	234	0	8	-10	-115	6.4	12.8	0.0	0.4	-0.6	-6.3
6/26/98	52	167	1	6	-53	-67	2.8	9.1	0.1	0.3	-2.9	-3.7
6/27/98	29	160	0	7	4	-142	1.6	8.7	0.0	0.4	0.2	-7.8
6/28/98	30	162	1	6	61	-198	1.6	8.8	0.0	0.3	3.3	-10.8
6/29/98	30	182	1	5	129	-285	1.6	9.9	0.1	0.3	7.0	-15.5
6/30/98	34	219	2	5	194	-382	1.8	11.9	0.1	0.3	10.6	-20.8
7/1/98	635	397	0	9	4	224	34.6	21.6	0.0	0.5	0.2	12.2
7/2/98	614	403	0	13	18	180	33.5	22.0	0.0	0.7	1.0	9.8
7/3/98	662	429	0	13	-2	222	36.1	23.4	0.0	0.7	-0.1	12.1
7/4/98	689	427	1	12	-2	253	37.6	23.3	0.0	0.6	-0.1	13.8
7/5/98	679	424	0	19	4	231	37.0	23.1	0.0	1.0	0.2	12.6
7/6/98	683	438	0	11	2	232	37.2	23.9	0.0	0.6	0.1	12.7
7/7/98	444	384	0	7	-85	137	24.2	20.9	0.0	0.4	-4.6	7.5
7/8/98	301	261	0	15	-42	67	16.4	14.2	0.0	0.8	-2.3	3.7
7/9/98	378	253	0	17	2	106	20.6	13.8	0.0	0.9	0.1	5.8
7/10/98	219	223	0	14	-33	14	11.9	12.2	0.0	0.8	-1.8	0.8
7/11/98	223	203	0	14	-4	11	12.2	11.0	0.0	0.7	-0.2	0.6
7/12/98	223	197	0	13	-6	19	12.2	10.7	0.0	0.7	-0.3	1.1
7/13/98	210	186	0	12	-10	23	11.4	10.1	0.0	0.6	-0.6	1.2
7/14/98	197	184	0	5	6	2	10.7	10.0	0.0	0.3	0.3	0.1
7/15/98	188	193	0	14	-8	-11	10.2	10.5	0.0	0.7	-0.4	-0.6
7/16/98	178	139	0	26	-50	63	9.7	7.6	0.0	1.4	-2.8	3.4
7/17/98	63	78	0	23	-61	23	3.4	4.2	0.0	1.3	-3.3	1.2
7/18/98	102	96	0	19	37	-50	5.5	5.2	0.0	1.0	2.0	-2.7
7/19/98	103	98	1	18	4	-17	5.6	5.3	0.0	1.0	0.2	-0.9
7/20/98	93	102	1	13	-4	-18	5.1	5.6	0.0	0.7	-0.2	-1.0
7/21/98	78	93	0	12	-8	-19	4.3	5.1	0.0	0.7	-0.4	-1.1
7/22/98	88	93	0	13	2	-20	4.8	5.0	0.0	0.7	0.1	-1.1
7/23/98	92	90	0	9	-4	-3	5.0	4.9	0.0	0.5	-0.2	-0.2
7/24/98	81	87	0	16	-8	-14	4.4	4.7	0.0	0.9	-0.4	-0.7
7/25/98	72	74	0	11	-14	1	3.9	4.0	0.0	0.6	-0.7	0.0
7/26/98	67	68	0	10	-4	-6	3.7	3.7	0.0	0.5	-0.2	-0.4
7/27/98	66	63	0	11	-8	0	3.6	3.4	0.0	0.6	-0.4	0.0
7/28/98	61	60	0	10	-2	-8	3.3	3.3	0.0	0.6	-0.1	-0.4
7/29/98	61	60	0	10	-2	-7	3.3	3.3	0.0	0.5	-0.1	-0.4
7/30/98	62	60	0	10	-2	-6	3.4	3.3	0.0	0.5	-0.1	-0.3
7/31/98	62	59	0	9	-2	-5	3.4	3.2	0.0	0.5	-0.1	-0.2
8/1/98	74	54	0	7	-6	20	4.0	2.9	0.0	0.4	-0.3	1.1
8/2/98	62	50	0	6	-4	10	3.4	2.7	0.0	0.3	-0.2	0.6
8/3/98	54	47	0	4	-4	6	2.9	2.5	0.0	0.2	-0.2	0.4
8/4/98	52	41	0	3	-13	21	2.8	2.2	0.0	0.2	-0.7	1.1
8/5/98	54	36	0	3	0	14	2.9	2.0	0.0	0.2	0.0	0.8
8/6/98	56	38	0	8	17	-6	3.1	2.1	0.0	0.4	0.9	-0.3

Date	Wetland 2, gpm						Wetland 2, cm					
	Inf	Outf	Precip	Evap	DVol	Seepage	Inf	Outf	Precip	Evap	DVol	Seepage
8/7/98	57	67	0	7	17	-34	3.1	3.6	0.0	0.4	0.9	-1.9
8/8/98	60	47	0	5	-27	34	3.2	2.6	0.0	0.3	-1.5	1.9
8/9/98	56	41	2	5	0	12	3.1	2.2	0.1	0.3	0.0	0.7
8/10/98	110	60	9	8	66	-15	6.0	3.3	0.5	0.4	3.6	-0.8
8/11/98	299	123	0	8	36	132	16.3	6.7	0.0	0.4	2.0	7.2
8/12/98	249	130	0	12	6	101	13.6	7.1	0.0	0.7	0.3	5.5
8/13/98	221	143	0	8	16	54	12.0	7.8	0.0	0.5	0.9	2.9
8/14/98	221	159	0	11	0	50	12.0	8.7	0.0	0.6	0.0	2.8
8/15/98	153	146	0	6	-22	23	8.3	8.0	0.0	0.3	-1.2	1.3
8/16/98	142	126	0	10	-16	22	7.8	6.9	0.0	0.5	-0.9	1.2
8/17/98	158	118	0	15	2	24	8.6	6.4	0.0	0.8	0.1	1.3
8/18/98	152	114	0	21	-8	25	8.3	6.2	0.0	1.2	-0.4	1.3
8/19/98	141	104	0	14	-10	33	7.7	5.7	0.0	0.8	-0.5	1.8
8/20/98	139	97	0	12	-4	33	7.6	5.3	0.0	0.7	-0.2	1.8
8/21/98	144	98	0	11	4	31	7.8	5.4	0.0	0.6	0.2	1.7
8/22/98	147	99	0	5	2	41	8.0	5.4	0.0	0.3	0.1	2.2
8/23/98	151	105	1	5	2	41	8.2	5.7	0.1	0.2	0.1	2.2
8/24/98	64	88	12	4	-53	37	3.5	4.8	0.7	0.2	-2.9	2.0
8/25/98	0	29	33	4	-54	54	0.0	1.6	1.8	0.2	-3.0	3.0
8/26/98	0	20	0	6	-6	-19	0.0	1.1	0.0	0.3	-0.3	-1.0
8/27/98	0	15	0	6	-8	-13	0.0	0.8	0.0	0.3	-0.4	-0.7
8/28/98	56	13	1	5	-1	40	3.0	0.7	0.0	0.3	-0.1	2.2
8/29/98	74	13	2	5	-1	59	4.0	0.7	0.1	0.3	-0.1	3.2
8/30/98	92	13	2	5	-1	78	5.0	0.7	0.1	0.3	-0.1	4.3
8/31/98	109	13	3	5	3	91	5.9	0.7	0.2	0.3	0.2	5.0
9/1/98	119	51	0	5	8	56	6.5	2.8	0.0	0.3	0.4	3.1
9/2/98	114	56	0	5	6	47	6.2	3.1	0.0	0.3	0.3	2.6
9/3/98	99	56	0	5	0	37	5.4	3.1	0.0	0.3	0.0	2.0
9/4/98	107	61	0	5	8	34	5.8	3.3	0.0	0.3	0.4	1.8
9/5/98	147	64	0	6	0	77	8.0	3.5	0.0	0.3	0.0	4.2
9/6/98	105	62	6	4	-4	49	5.7	3.4	0.3	0.2	-0.2	2.7
9/7/98	105	58	12	3	-4	60	5.7	3.2	0.7	0.2	-0.2	3.3
9/8/98	105	55	0	5	-6	50	5.7	3.0	0.0	0.3	-0.3	2.8
9/9/98	87	52	0	6	-4	33	4.8	2.8	0.0	0.3	-0.2	1.8
9/10/98	74	46	0	6	-8	30	4.0	2.5	0.0	0.3	-0.4	1.6
9/11/98	72	44	0	5	0	23	3.9	2.4	0.0	0.3	0.0	1.2
9/12/98	71	44	0	5	-4	25	3.9	2.4	0.0	0.3	-0.2	1.4
9/13/98	69	43	0	5	0	21	3.8	2.3	0.0	0.3	0.0	1.2
9/14/98	71	41	0	4	0	26	3.9	2.3	0.0	0.2	0.0	1.4
9/15/98	27	21	0	3	0	3	1.5	1.1	0.0	0.2	0.0	0.2
9/16/98	0	0	0	3	0	-3	0.0	0.0	0.0	0.2	0.0	-0.2
9/17/98	0	0	0	4	0	-4	0.0	0.0	0.0	0.2	0.0	-0.2
9/18/98	0	0	0	4	0	-4	0.0	0.0	0.0	0.2	0.0	-0.2
9/19/98	0	0	0	4	0	-3	0.0	0.0	0.0	0.2	0.0	-0.2
9/20/98	0	0	0	4	0	-3	0.0	0.0	0.0	0.2	0.0	-0.2
9/21/98	0	0	6	3	0	3	0.0	0.0	0.3	0.2	0.0	0.1
9/22/98	0	0	9	4	0	6	0.0	0.0	0.5	0.2	0.0	0.3
9/23/98	0	0	0	5	0	-5	0.0	0.0	0.0	0.3	0.0	-0.3
9/24/98	0	0	0	4	0	-4	0.0	0.0	0.0	0.2	0.0	-0.2

Date	Wetland 2, gpm						Wetland 2, cm					
	Inf	Outf	Precip	Evap	DVol	Seepage	Inf	Outf	Precip	Evap	DVol	Seepage
9/25/98	0	0	0	3	0	-3	0.0	0.0	0.0	0.2	0.0	-0.2
9/26/98	0	0	3	4	0	-1	0.0	0.0	0.2	0.2	0.0	-0.1
9/27/98	0	0	6	4	0	2	0.0	0.0	0.3	0.2	0.0	0.1
9/28/98	0	0	0	5	0	-5	0.0	0.0	0.0	0.3	0.0	-0.3
9/29/98	0	0	0	5	0	-5	0.0	0.0	0.0	0.3	0.0	-0.3
9/30/98	0	0	0	5	0	-5	0.0	0.0	0.0	0.3	0.0	-0.3
10/1/98	0	41	0	2	0	-43	0.0	2.2	0.0	0.1	0.0	-2.4
10/2/98	0	41	6	1	0	-37	0.0	2.2	0.3	0.1	0.0	-2.0
10/3/98	0	41	29	0	0	-13	0.0	2.2	1.6	0.0	0.0	-0.7
10/4/98	0	41	0	1	0	-42	0.0	2.2	0.0	0.0	0.0	-2.3
10/5/98	0	41	0	1	0	-43	0.0	2.2	0.0	0.1	0.0	-2.3
10/6/98	0	41	11	1	0	-32	0.0	2.2	0.6	0.1	0.0	-1.7
10/7/98	0	41	53	0	0	11	0.0	2.2	2.9	0.0	0.0	0.6
10/8/98	0	41	0	1	0	-42	0.0	2.2	0.0	0.0	0.0	-2.3
10/9/98	218	47	0	1	60	110	11.9	2.6	0.0	0.1	3.3	6.0
10/10/98	781	227	0	2	193	358	42.6	12.4	0.0	0.1	10.5	19.5
10/11/98	599	375	0	2	9	213	32.6	20.4	0.0	0.1	0.5	11.6
10/12/98	315	269	0	2	-99	143	17.2	14.6	0.0	0.1	-5.4	7.8
10/13/98	267	179	0	2	-35	121	14.6	9.7	0.0	0.1	-1.9	6.6
10/14/98	230	150	0	1	-14	94	12.5	8.1	0.0	0.1	-0.8	5.1
10/15/98	211	143	0	2	-8	75	11.5	7.8	0.0	0.1	-0.4	4.1
10/16/98	213	126	0	2	-12	97	11.6	6.9	0.0	0.1	-0.7	5.3
10/17/98	192	123	4	1	2	69	10.5	6.7	0.2	0.1	0.1	3.8
10/18/98	155	128	18	1	2	42	8.5	7.0	1.0	0.0	0.1	2.3
10/19/98	131	112	0	2	-28	45	7.2	6.1	0.0	0.1	-1.5	2.5
10/20/98	143	94	0	2	-14	62	7.8	5.1	0.0	0.1	-0.7	3.4
10/21/98	143	86	2	1	2	55	7.8	4.7	0.1	0.1	0.1	3.0
10/22/98	201	97	0	2	22	81	11.0	5.3	0.0	0.1	1.2	4.4
10/23/98	220	117	0	2	10	91	12.0	6.4	0.0	0.1	0.5	5.0
10/24/98	185	113	0	2	-16	87	10.1	6.1	0.0	0.1	-0.9	4.7
10/25/98	108	99	0	1	-8	16	5.9	5.4	0.0	0.1	-0.4	0.9
10/26/98	146	95	0	1	-2	52	8.0	5.2	0.0	0.1	-0.1	2.8
10/27/98	125	89	0	1	-6	41	6.8	4.9	0.0	0.0	-0.3	2.2
10/28/98	202	90	0	1	20	92	11.0	4.9	0.0	0.0	1.1	5.0
10/29/98	245	95	0	1	36	114	13.4	5.2	0.0	0.0	2.0	6.2
10/30/98	288	102	0	1	52	133	15.7	5.6	0.0	0.1	2.8	7.3
10/31/98	306	112	0	1	58	135	16.7	6.1	0.0	0.1	3.2	7.4
9/1/98	201	118	4	0	36	51	11.0	6.4	0.2	0.0	2.0	2.8
9/2/98	378	195	9	0	45	148	20.6	10.6	0.5	0.0	2.4	8.1
9/3/98	293	203	2	0	-10	102	16.0	11.1	0.1	0.0	-0.6	5.5
9/4/98	191	177	0	0	-59	73	10.4	9.6	0.0	0.0	-3.2	4.0
9/5/98	104	79	0	0	-55	80	5.7	4.3	0.0	0.0	-3.0	4.4
9/6/98	70	70	0	0	-42	42	3.8	3.8	0.0	0.0	-2.3	2.3
9/7/98	0	20	0	0	-66	45	0.0	1.1	0.0	0.0	-3.6	2.5
9/8/98	109	7	0	0	38	64	6.0	0.4	0.0	0.0	2.0	3.5
9/9/98	167	43	9	0	63	70	9.1	2.3	0.5	0.0	3.4	3.8
9/10/98	228	107	18	0	49	90	12.5	5.8	1.0	0.0	2.7	4.9
9/11/98	192	110	0	0	6	76	10.5	6.0	0.0	0.0	0.3	4.1
9/12/98	214	135	0	0	24	55	11.7	7.4	0.0	0.0	1.3	3.0

Date	Wetland 2, gpm						Wetland 2, cm					
	Inf	Outf	Precip	Evap	DVol	Seepage	Inf	Outf	Precip	Evap	DVol	Seepage
9/13/98	156	148	0	0	4	3	8.5	8.1	0.0	0.0	0.2	0.2
9/14/98	221	140	0	0	-26	107	12.1	7.6	0.0	0.0	-1.4	5.9
9/15/98	223	116	0	0	6	101	12.2	6.3	0.0	0.0	0.3	5.5
9/16/98	221	141	0	0	12	67	12.0	7.7	0.0	0.0	0.7	3.7
9/17/98	222	127	0	0	-50	145	12.1	6.9	0.0	0.0	-2.7	7.9
9/18/98	197	59	0	0	-23	161	10.7	3.2	0.0	0.0	-1.3	8.8
9/19/98	131	99	4	0	41	-5	7.1	5.4	0.2	0.0	2.2	-0.3
9/20/98	131	107	9	0	-6	38	7.1	5.9	0.5	0.0	-0.3	2.1
9/21/98	127	96	0	0	-10	41	6.9	5.2	0.0	0.0	-0.5	2.2
9/22/98	123	89	0	0	-4	38	6.7	4.8	0.0	0.0	-0.2	2.1
9/23/98	119	91	0	0	4	24	6.5	5.0	0.0	0.0	0.2	1.3
9/24/98	122	88	7	0	-8	48	6.6	4.8	0.4	0.0	-0.4	2.6
9/25/98	122	85	15	0	2	49	6.6	4.7	0.8	0.0	0.1	2.7
9/26/98	122	89	3	0	6	30	6.7	4.9	0.2	0.0	0.3	1.6
9/27/98	123	94	0	0	2	27	6.7	5.1	0.0	0.0	0.1	1.5
9/28/98	130	89	0	0	-10	50	7.1	4.8	0.0	0.0	-0.5	2.7
9/29/98	133	87	0	0	-8	54	7.3	4.8	0.0	0.0	-0.4	2.9
9/30/98	137	86	0	0	-8	59	7.5	4.7	0.0	0.0	-0.4	3.2
12/1/98	84	69	0	0	-14	29	4.6	3.8	0.0	0.0	-0.7	1.6
12/2/98	95	60	0	0	0	35	5.2	3.3	0.0	0.0	0.0	1.9
12/3/98	107	70	0	0	12	25	5.8	3.8	0.0	0.0	0.6	1.4
12/4/98	102	71	0	0	-2	33	5.6	3.9	0.0	0.0	-0.1	1.8
12/5/98	104	70	0	0	-2	36	5.7	3.8	0.0	0.0	-0.1	1.9
12/6/98	103	70	3	0	4	32	5.6	3.8	0.1	0.0	0.2	1.8
12/7/98	104	75	13	0	-4	46	5.7	4.1	0.7	0.0	-0.2	2.5
12/8/98	95	58	0	0	-27	64	5.2	3.2	0.0	0.0	-1.5	3.5
12/9/98	68	45	0	0	-8	31	3.7	2.4	0.0	0.0	-0.4	1.7
12/10/98	61	41	0	0	-4	24	3.3	2.3	0.0	0.0	-0.2	1.3
12/11/98	92	43	0	0	13	36	5.0	2.3	0.0	0.0	0.7	2.0
12/12/98	122	59	0	0	19	43	6.6	3.2	0.0	0.0	1.1	2.3
12/13/98	112	69	0	0	8	35	6.1	3.7	0.0	0.0	0.4	1.9
12/14/98	101	71	0	0	0	30	5.5	3.8	0.0	0.0	0.0	1.6
12/15/98	101	73	2	0	6	23	5.5	4.0	0.1	0.0	0.3	1.3
12/16/98	104	73	9	0	-2	41	5.7	4.0	0.5	0.0	-0.1	2.2
12/17/98	107	77	2	0	0	32	5.9	4.2	0.1	0.0	0.0	1.8
12/18/98	105	77	0	0	4	24	5.7	4.2	0.0	0.0	0.2	1.3
12/19/98	105	77	1	0	-2	30	5.7	4.2	0.0	0.0	-0.1	1.6
12/20/98	109	74	17	0	-2	54	6.0	4.1	0.9	0.0	-0.1	3.0
12/21/98	98	86	83	0	31	64	5.3	4.7	4.5	0.0	1.7	3.5
12/22/98	65	77	0	0	12	-24	3.5	4.2	0.0	0.0	0.7	-1.3
12/23/98	45	45	0	0	0	0	2.4	2.4	0.0	0.0	0.0	0.0
12/24/98	47	47	0	0	0	0	2.6	2.5	0.0	0.0	0.0	0.0
12/25/98	49	59	0	0	-10	0	2.7	3.2	0.0	0.0	-0.5	0.0
12/26/98	42	50	0	0	-8	0	2.3	2.7	0.0	0.0	-0.4	0.0
12/27/98	29	37	0	0	-8	0	1.6	2.0	0.0	0.0	-0.4	0.0
12/28/98	12	55	0	0	-43	0	0.6	3.0	0.0	0.0	-2.3	0.0
12/29/98	8	61	1	0	-52	0	0.4	3.3	0.1	0.0	-2.8	0.0
12/30/98	4	67	1	0	-62	0	0.2	3.7	0.1	0.0	-3.4	0.0
12/31/98	52	71	2	0	-17	0	2.8	3.9	0.1	0.0	-1.0	0.0